

Lesson 3 – Content Notes

Decimals

A decimal is a way of writing a number that is not whole. Decimal numbers are 'in-between' numbers.

For example: 5.25 is **in between** the numbers 5 and 6. It is **more** than 5, but **less** than 6.

Note: Decimals can be converted to and from percentages and to and from fractions ☺

For example: $\frac{1}{4}$ (a quarter) of a dollar is the same as 0.25 cents



Place Value and Decimals

Hundred Billions	Ten Billions	Billions		Hundred Millions	Ten Millions			Hundred Thousands	Ten Thousands	Thousands		Hundreds	Tens	Ones/Units		Tenths	Hundredths	Thousandths	Ten Thousandths	Hundred Thousandths
2	1	0	,	9	8	7	,	6	5	4	,	3	2	1	.	2	3	4	5	6

This chart shows the place value of the number 210,987,654,321.23456.



This is how you say it :

“Two hundred ten billion, nine hundred eighty seven million, six hundred fifty four thousand, three hundred twenty one, and twenty three thousand four hundred fifty six hundred thousandths”

Powers of 10

A **power of 10** is any of the integer powers of the number ten; in other words, ten multiplied by itself a certain number of times

Powers of 10 Chart	
<p>Billions $10^9 = 1,000,000,000$ $10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 1,000,000,000$</p> <p>Millions $10^6 = 1,000,000$ $10 \times 10 \times 10 \times 10 \times 10 \times 10 = 1,000,000$</p> <p>Hundred Thousands $10^5 = 100,000$ $10 \times 10 \times 10 \times 10 \times 10 = 100,000$</p> <p>Ten Thousands $10^4 = 10,000$ $10 \times 10 \times 10 \times 10 = 10,000$</p> <p>Thousands $10^3 = 1,000$ $10 \times 10 \times 10 = 1,000$</p> <p>Hundreds $10^2 = 100$ $10 \times 10 = 100$</p> <p>Tens $10^1 = 10$ ones $100 = 1$</p>	<p>Tenths $10^{-1} = 1/10$ $1/10 = 0.1$</p> <p>Hundredths $10^{-2} = 1/100$ $1/100 = 0.01$</p> <p>Thousandths $10^{-3} = 1/1000$ $1/1000 = 0.001$</p> <p>Ten Thousandths $10^{-4} = 1/10000$ $1/10000 = 0.0001$</p> <p>Hundred Thousandths $10^{-5} = 1/100000$ $1/100000 = 0.00001$</p> <p>Millionths $10^{-6} = 1/1000000$ $1/1000000 = 0.000001$</p> <p>Billionths $10^{-9} = 1/1000000000$ $1/1000000000 = 0.000000001$</p>

Scientific Notation

- ❖ Do you know this number, 300,000,000 m/sec.?

It's the Speed of light !

- ❖ Do you recognize this number, 0.000 000 000 753 kg. ?

This is the mass of a dust particle!



Scientists have developed a shorter method to express very large numbers. This method is called **scientific notation**. Scientific Notation is based on powers of the base number 10.

The number 127,000,000,000 in scientific notation is written as:

$$1.27 \times 10^{11}$$

The first number 1.27 is called the coefficient. It must be greater than or equal to 1 and less than 10.

The second number is called the base . It must always be 10 in scientific notation. The base number 10 is always written in exponent form. In the number 1.27×10^{11} the number 11 is referred to as the exponent or power of ten.

So the number is written in **two parts**:

- Just the **digits** (with the decimal point placed after the first digit), followed by
- **$\times 10$ to a power** that puts the decimal point where it should be (i.e. it shows how many places to move the decimal point).

For example:

Write 5326.6 in scientific notation

5326.6 is written as **5.3266×10^3** ,

...because...

$$5326.6 = 5.3266 \times 1000 = 5.3266 \times 10^3$$



Check Point

After putting the number in Scientific Notation, make sure that:

- The "digits" part is between 1 and 10 (it can be 1, but never 10)
- The "power" part shows exactly how many places to move the decimal point

For more examples go to: <https://www.purplemath.com/modules/exponent3.htm>